The Next Generation Seed System in Canada

Seed Synergy White Paper

Version 4.0 – November 2018

Executive Summary

Agriculture in Canada has three broad goals:

- Deliver a safe, secure, diverse, and sustainable supply of food, feed, fuel, fibre, forage, and turf as Canada rises to meet the challenge of a growing global population (responding to the key social and environmental challenges of our era)
- Drive growth, to the benefit of Canadian producers and the public (Canada's Economic Strategy Table calls for growth of $30B domestic and $20B in exports by 2025)
- Innovate to fuel growth and succeed in a highly competitive global marketplace (encapsulated in the innovation agenda)

The Canadian seed sector – which develops and commercializes plant innovation – is a critical enabler of these goals, and drives the success of the entire agriculture sector. To assure its continued success the seed sector requires a bold new vision and important structural changes so that it can adapt to the demands of new technologies, new business models and an increasingly global marketplace. Canada's seed system has a rich history and a solid foundation, but lags behind leaders like France and the Netherlands, and without change now we will miss out on investment and innovation opportunities.

The Seed Synergy Collaboration (SSC) was formed to develop the vision for the next generation seed system, bringing together the six major national seed industry organizations: the Canadian Seed Growers' Association (CSGA), the Canadian Seed Trade Association (CSTA), the Canadian Seed Institute (CSI), the Commercial Seed Analysts Association of Canada (CSAAC), the Canadian Plant Technology Agency (CPTA) and CropLife Canada. These organizations represent the seed sector value chain beginning with research & development, production & processing, through to marketing, sales & distribution. The Seed Synergy partners have consulted extensively with their members, with the seed and crop value chains, and with government. The SSC commissioned independent studies; it developed and tested proposals.

All of this has led to this document, which lays out a set of proposals for the future of the seed sector and agriculture in Canada, based on: **Stimulating Innovation**, **Modernizing the Seed Regulatory Framework**, and **Building the Next Generation Seed Organization**. To realize this vision we believe that industry and government must work together to realize six key changes:

1. Update the delivery of the novel products regulations for plant breeding innovation
2. Implement a seed variety use agreement (trailing royalty) system for intellectual property-protected seed
3. Amend the *Seeds Regulations* to streamline requirements and enable modernization of the seed regulatory framework, including incorporation by reference
4. Define a new, industry-delivered model for the seed certification program
5. Create a single window for all seed regulatory services, facilitated by information technology, and including a "variety profile" data management system for all commercial varieties so that end users can make informed decisions
6. Create a more efficient and effective industry organizational model

This paper explains exactly what we mean by each of these proposals, and why they are so important. We believe that these proposals are not just incremental fixes to the irritants of the day. Rather, this is a comprehensive and integrated package of changes that will transform the sector. Taken together, the elements of the Seed Synergy vision will:

- Drive overall agriculture sector growth and assure that Canadian producers can adapt to evolving market demands
- Attract investment, domestically and internationally, and make Canada an innovation destination
- Level the playing field for everyone, particularly small and medium operators who today cannot risk the high cost of innovation in Canada
- Drive the adoption of technology and further traceability capacity that will maintain Canada's brand as a safe and secure supplier to the world
- Ensure that the seed system is run efficiently and adapts to change on a continuing basis

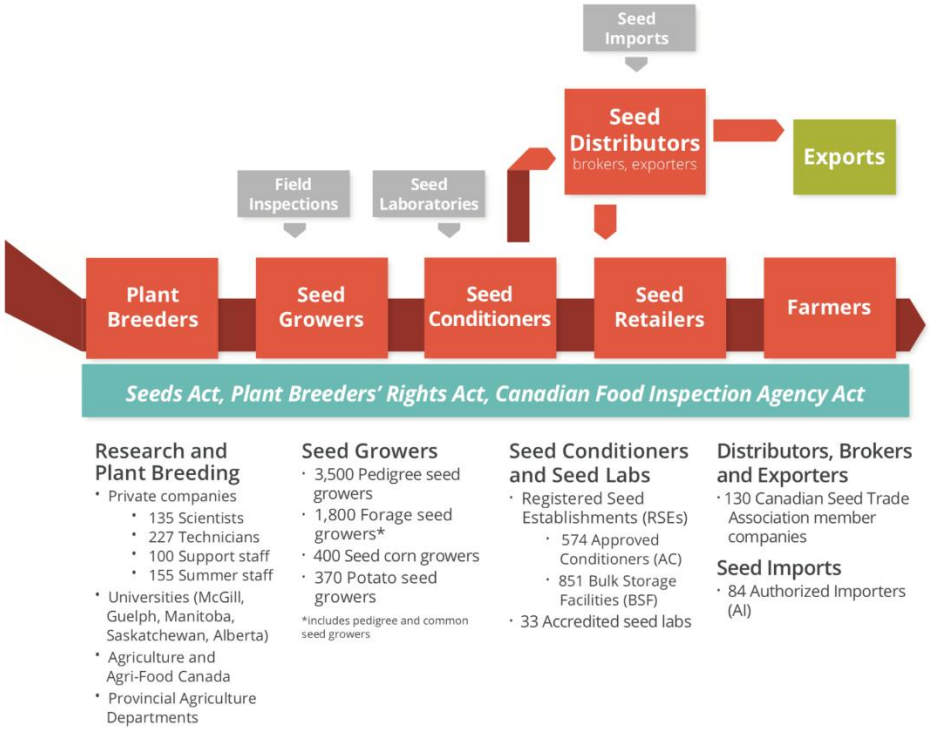
Context

The Seed Synergy Partners

This White Paper is the product of extensive collaboration and consultation over more than two years, under the banner of the Seed Synergy Collaboration Project. Six organizations – the Canadian Seed Growers' Association, the Canadian Seed Institute, the Canadian Seed Trade Association, CropLife Canada, the Commercial Seed Analysts Association, and the Canadian Plant Technology Agency – first worked together to develop a set of principles and characteristics of a future seed system. Then the organizations developed a preliminary vision (Green Paper) of what that future might look like, and engaged with hundreds of seed sector value chain members at association meetings, online, and via a national engagement series in six locations across the country. At the same time the project commissioned an independent Economic Impact Analysis and Risk Assessment, which evaluated the major policy ideas present in the Green Paper and compared Canada with other jurisdictions. Finally, the project included a detailed governance assessment, reviewing possible models for sector governance. Some of these activities were made possible through funding under the federal government's AgriRisk Initiative program, underscoring the positive outcomes that result when government and industry work together.

About the seed sector

The seed sector is comprised of various actors performing key functions: plant research and variety development; seed growing; seed processing; seed testing; and seed marketing. The diagram below, taken from the Seed Sector Value Chain Roundtable's *Canadian Seed Sector Profile (2014)* provides an overview of what the system looks like, the key pieces of enabling legislation, and who the players are.



Why the Seed Sector is Important

Seed is the third largest crop in Canada (after only canola and wheat), with farm cash receipts of $2.57B in 2017 (*Statistics Canada*). The *Economic Impact Assessment and Risk Analysis* found the total economic impact (direct and indirect) of the seed industry to be over $6B.

As of 2014, the seed industry was estimated to employ almost 60,000 Canadians, generating $1.67B in annual wages and salaries, and generating about $81.9M in tax revenue. Direct employment in the sector is diverse, including farmers, scientists, technicians, analysts, sales personnel, and more, spread across Canada.

Seeds deliver advanced genetics for commercial farm operations and are an integral input into Canadian farmers' $34B in annual crop production (*Statistics Canada*), as well as the crops used as home-grown feed and forages for livestock operations. CropLife Canada's *Driving the Canadian Advantage* report describes the value of innovation: "plant science innovations help farmers improve productivity on existing Canadian farmland, saving more than 35 million acres of natural land that would otherwise have to be used for agriculture … Every day consumers benefit from plant science innovations. The average Canadian family saves about $4,400 a year on food costs thanks to efficient, high-yield farming practices, enabled through plant science technologies".

The seed sector is also integral to Canada's success as a trading nation, assuring that Canadian producers can deliver the cutting edge traits, and strong traceability and security demanded by export markets around the world.

Industry-Government Partnership

Canada's seed system is over 100 years old, and boasts a proud track record of delivering safe, quality assured seed products to Canadian farmers. Considerable change has occurred over the past three decades, and the system needs renewal to position Canadian agriculture for success going forward. A generation ago, public breeding was the dominant innovation model, Canadian production focused on fewer crop types and varieties, and fees for publically delivered regulatory services were low. Successive governments have progressively scaled back government support, but without a long-term plan. The regulatory framework has been unable to keep pace with the rapid advancements in technology and innovation.

Administration of the seed system has been – from the very beginning – a partnership between the public and private sectors. This paper charts a course for renewing that partnership. Industry now plays a strong leadership role, in line with the 40 year trend of gradual government reduction of resources and direct service delivery. However, industry's role remains informal in places, and not fully defined, with government retaining overall responsibility for the seed system, but without the resources to match the demand for change.

Seed Drives Canadian Agriculture

The majority of Canada's agriculture sector depends, at some point in the value chain, on seed and the benefits of the industry touch on many different sectors. A thriving seed industry means producers with improved choice of even better varieties, able to make informed decisions about the crops and varieties that work for their conditions, and meet the needs of their customers. It means increased trade and engagement with international markets, and it means economic benefits for everyone in the seed value chain.

Key Challenges and Solutions

Stimulating Innovation

- The process for bringing new innovations to market is difficult and costly to navigate, and can discourage smaller players
- For many crop kinds, innovators do not have a clear path to creating value from their innovations
- Other markets with more predictable regulatory processes are attracting investment, and Canada is missing out

Modernizing the Seed Regulatory Framework

- The growth and diversification of the seed industry has outpaced government capacity to respond, and government needs to focus its resources on where they can have the greatest impact
- Government has privatized numerous functions within the system, but without a long-term vision, lagging behind world leading seed systems
- Regulatory processes are outdated, and rely on a mix of electronic and paper information management systems; seed professionals in various roles have to input information multiple times, through different responsibility centres
- Publicly available information about varieties in commercial use in Canada is not readily available

Building the Next Generation Seed Organization

- Six industry organizations play policy, advocacy, governance, and service delivery roles, creating a patchwork of overlapping interest and responsibility
- In the past industry's voice to government and partners has been diffuse and disunited until recently, making industry leadership difficult to realize
- The various organizations have overlapping memberships and even directors, creating a significant draw on member time and resources
- The seed industry lacks proper resourcing for the on-going training and development of seed industry professionals

The balance of this paper will describe the specific changes recommended to address challenges in each of these three areas.

Stimulating Innovation

The seed industry is driven by innovation. New research identifies traits that offer a competitive advantage to producers, and drives growth in Canada's agricultural sector. Canadian innovators, however, face two major barriers. First, the approval process for bringing new products to market is unpredictable and costly, which drives multinational firms not to invest in Canada, and creates a major barrier for small players to enter the market. Second, for most crop kinds there is no efficient way for an innovator to generate a reasonable return on their investment. As a result, innovators often choose to invest abroad, or not at all.

A 2018 study by researchers at the University of Saskatchewan tells the story. The researchers surveyed the private and public plant breeding community in Canada for insights into how they view and operate within the system of today. 42% of study respondents indicated that they have had at least one research proposal turned down due to uncertainty about regulatory costs. More troublingly, 45% of respondents indicated that they have terminated innovative research due to the risk of the final product being considered 'novel' and the ensuing regulatory requirements that would follow. These are real examples of the regulatory system driving Canadians away from innovation.

Where innovation does occur it is largely aligned with mechanisms for value creation. In a 2018 *Snapshot of Private Innovation Investment in Canada's Seed Sector* survey of its members' research investment decisions and plans, the Canadian Seed Trade Association found that overall investment in research in Canada has tripled since 2007, reaching $171M in 2017. This is, of course, a very positive trend, demonstrating the powerful impact of stronger intellectual property protection. However, investment remains disproportionately focused on crops with mature value creation models. Corn alone accounts for 56% of all research expenditures in Canada.

We propose two major changes to stimulate innovation: reforms to the delivery of novel product regulations for plant breeding innovations, and the adoption of a trailing contract royalty model for value creation.

Better delivery of novel product regulations

Any innovation-based system must assure that new technologies meet Canada's high standards for human, animal feed, and environmental health and safety. Safety assurance is a key government role, and should remain so; the federal government has authority and expertise, considers a broad public interest, and its independence assures continued confidence in the integrity of the review process.

Where change is necessary is in how the safety assurance delivery model is operated. The Canadian system was developed over 20 years ago and is unique compared to the rest of the world. In Canada, assessments are triggered by end product novelty rather than the common global approach of triggering on the process by which the trait was developed. The novelty model is a more scientifically sound approach, however the development of novelty is the goal of all innovation which makes the delivery of this system more challenging and prone to confusion for plant breeders and product developers.

Once a novel product triggers oversight in the Canadian system it enters a regulatory process with neither defined timelines nor standardized information requirements. As a result, innovation is stifled amongst all developers, and especially for small and medium enterprises who simply cannot afford to risk lengthy and unpredictable reviews. The regulatory process in Canada averages two years but has taken up to three or more in some cases, and the 2018 *Economic Impact Assessment and Risk Analysis – Summary Report* found that "by reducing the time required for a regulatory decision by one year, the potential benefit to product developers of earlier commercialization can approach $16 million. Similarly, farmer benefits can approach $38 million over a five year period for each new novel trait commercialized one year earlier."

We envision a revised system wherein the unique Canadian novelty model is maintained but modernized to reflect the more than 20 years of industry product development, government regulatory experience and the

long history of safety for products of conventional plant breeding (see the National Academies of Sciences, Engineering, and Medicine *Committee On Genetically Engineered Crops: Past Experience And Future Prospects* report for an extensive review). The solution is the development of clear regulatory triggers leading to a tiered approach to regulation, wherein the federal government would define levels of assessment and corresponding data requirements and timelines. Doing so would involve changing how we deliver the current system, but would not require legislative or regulatory change. All products would be subject to an appropriate review. For example, traits that are very similar to already-approved technologies would see streamlined review, while traits that are unlike products on the market would be subject to additional review and assessment when appropriate. In all cases the pathway to regulatory decision-making would be transparent to any interested party.

This proposal is about using health & safety assessment processes as efficiently as possible to deliver strong results for Canadians, a clear pathway to commercialization for plant breeders and product developers, and in no way suggests any compromise on the rigour and integrity of health and safety assurance for new plant technologies. Finally, we can see a long term goal of harmonizing Canada's system with that of the United States (as per policy goals expressed in the new *United States Mexico Canada Agreement*) to reflect the integrated nature of the Canada-U.S. market.

Required Action

Government – with industry input – improves how novel product regulations are implemented, by instituting clear regulatory triggers, predictable timelines, and adapting processes to match the degree of novelty in question. Traits that are very similar to already approved traits should be subject to simpler reviews.

Value Creation

Value creation is a critical feature of any innovation system. Innovators receive a return on their investments, or there is little incentive to develop new products. Canada, which in a previous era relied on publicly-funded plant breeding programs, has difficulty stimulating private investment, particularly for cereals. While substantial investment in government-funded breeding programs in Canada continues, with an estimated $80 million a year, private sector investment in plant breeding innovation has grown to $125 million a year. However, this private sector investment focuses on a limited number of crop kinds with over 50% of all investments in canola and 95% of investment dollars in just five crops. Internationally, this results in a competitive disadvantage as compared to countries like France and the Netherlands in developing and marketing new varieties that benefit producers and end users alike. The future of plant breeding innovation is dependent on attracting higher levels of private sector investment and ensuring that public sector investment is directed to where it is most needed.

Canada needs an effective value creation model to improve seed genetics in all crop kinds, particularly cereals. The best model is one that offers value, transparency and producer choice. With these principles in mind, the Seed Synergy project envisions **reasonable royalties for all intellectual property protected seed products.** The royalty would be collected through contract (through a Seed Variety Use Agreement) at the point of sale.

This Seed Variety Use Agreement (SVUA) is a contractual restriction on farm-saved seed. Producers who purchase certified cereal seed enter into a contract with the seller, agreeing not to reuse the seed in following years for planting without declaring such an intent. If the producer does wish to reuse the seed, a Seed Variety Use Fee (SVUF) will apply. The SVUF payments would be provided directly to variety developers.

Producers who choose to buy IP-protected seed will have a choice: they can purchase seed every year, or they can pay a Seed Variety Use Fee (SVUF) to the variety developer to use subsequent generations of that product. Producers will remain free to choose from the many non-IP-protected varieties in the marketplace. The SVUF will be set by the plant breeder and will be specific to each variety based on the value that variety creates. This SVUF will be invoiced to the producer every year that the farm saved seed of the protected variety is grown. This model will benefit private and public breeders alike, regardless of size, without the need for complex national tracking or check-off schemes.

The *Economic Impact Assessment and Risk Analysis – Summary Report* demonstrates the potential of a value creation model. Today the total share of UPOV'91 varieties by acreage is low and is clustered in a small number of crops. However, increasing the UPOV'91 share to 50%, while instituting a SVUA, would generate an additional $24.2 million for innovation. This investment would, in turn, generate $170 million in annual benefits for farmers and a $340 million gain to the broader economy each year. Resources invested in innovation create a ripple effect throughout the agricultural value chain and will position Canada as a world leader for research and new product development.

Required Action

Implement a Seed Variety Use Agreement model that would allow producers to choose Certified seed or use intellectual-property protected varieties as farm-saved seed, in exchange for a reasonable royalty payment. Government should amend the *Plant Breeders' Rights Regulations* to enable this model, and create a regulatory framework to govern it. Industry can lead here, and government retains a strong role in oversight and assuring the integrity of the system. Private and public developers would have greater incentives for innovation, and all producers would retain the choice to use the IP-protected or non-protected varieties that meet their needs.

Modernizing the Seed Regulatory Framework

Since its inception over 100 years ago, Canada's seed system has been a public-private partnership, with government playing the leadership role (see *Canada's Seed System: A Summary Description* for a detailed picture of the system of today, and how it evolved historically). Over the course of the last 40 years the leadership focus, design and delivery of Canada's seed regulatory system has evolved substantially, with: legislative and regulatory authorities transferred from Agriculture and Agri-food Canada to the Canadian Food Inspection Agency; the establishment of intellectual property protection for new plant varieties through the enactment of and recent amendments to the Plant Breeders' Rights Act; the introduction of a globally unique "novel products" approach for ensuring the environmental, food and feed safety of new plant genetics entering commerce; and the delegation of authority for the regulated components of seed quality assurance from government to an increasingly fragmented array of para-public and private entities. In parallel, while annual investment in government and producer funded breeding programs in Canada continues at substantial levels (current estimates $80M), its overall relative importance to Canadian agriculture has diminished as annual private sector investment in plant breeding innovation has grown (current estimates $171M annually – *CSTA Snapshot of Private Innovation Investment*).

The public-private partnership balance has therefore evolved, but the formal structures and authorities of the seed system have not evolved at a similar pace. This calls for real change to sustain success for the long-term.

In addition, the seed system has been slow to leverage current and emerging information technologies, both to drive overall process efficiencies, but also to improve the user experience of the many different people who interact with the various regulatory aspects of the system.

Seeds Regulations Modernization

The CFIA has provided notice that it intends to modernize the *Seeds Regulations* and has suggested that a proposal for change may be published in the *Canada Gazette*, Part I in winter 2020. The Seed Synergy partners are strongly committed to engaging with government in a positive and constructive way to ensure that the review, evaluation and proposed changes to the *Seeds Regulations* meet the needs of the seed sector, Canadian agriculture and the broader community of interests.

Currently, the *Seeds Regulations* contain technical provisions that, for example, prescribe the quality standards that seed shall meet in order to be imported or sold in Canada. This includes standards for germination, presence of weed seeds and some disease requirements. Numerous grade standards and detailed labelling provisions can only be changed by Order-In-Council (cabinet approval). Incorporation by reference is a simple and powerful regulatory drafting mechanism that can be used to drive greater efficiency without major barriers to adoption. It enables the referencing of documents that reside outside of regulations, into regulations and gives them the force of law. So, for example, a document that sets out detailed technical seed quality requirements could be established and maintained by industry and incorporated into the *Seeds Regulations* by reference, avoiding the need for a lengthy and costly federal regulatory process every time minor adjustments are needed.

Required Action

Develop a "Seed Certification Handbook" setting out all of the requirements for certification of seed and incorporate it by reference in the *Seeds Regulations*, enabling the seed regulatory framework to adapt to changing conditions without resource-intensive and lengthy regulatory change processes.

Industry Delivery of the Seed Certification Program

The most significant strategy adopted by government for dealing with cost pressures has been to privatize specific seed program elements, in the process freeing up government resources for reallocation to higher priority areas. This strategy has included: the authorization of private, accredited seed laboratories to test seed for import release purposes (1976) and then for official certification purposes (1986), followed in 1997 by the official recognition of the Canadian Seed Institute (created by the private sector to avoid proposed fee increases), and again in 2012 with the decision to privatize seed crop inspections.

In taking this piecemeal approach to the design of the seed certification system, and privatizing certain functions but not reviewing overall authorities, Canada now lags behind world leaders. The *Economic Impact Assessment and Risk Analysis* examined a number of international jurisdictions to identify best practices. That report found that the world-leading Dutch and French models in particular are excellent examples for Canada. In those countries, core seed system functions are delivered efficiently and effectively through robust national seed organizations and broadly supported industry governance models.

While subject to strict regulation and close government oversight, these organizations (the NAK in the Netherlands and GNIS in France) deliver or facilitate seed varietal certification, seed phytosanitary certification, royalty collection, market development, training and education, and other important functions that drive investment in their agriculture sectors. These vibrant private delivery models are the product of decades of evolution and iterative change that benefitted from a foundational vision, where the respective roles and responsibilities of industry and government in the partnership were well defined, understood and broadly supported from the start. In contrast, Canada's federal government retains authority for a variety of features of the seed system, but without the resources required to deliver. Moreover three separate entities (CFIA, CSGA, and CSI) play regulatory roles. As a result, change is difficult, it takes too long, the regulatory framework consistently lags behind present practices and technology, and limited government resources are spread too thinly to be effective.

It is time for Canada to transform its seed certification system in a similar manner as in other jurisdictions, by developing a new model featuring strong industry leadership with government oversight, enforcement, and science support. In so doing, we will focus industry and government resources on where they can be most impactful, and reduce impediments to change and improvement.

Specifically, the Seed Synergy vision proposes that government formally delegate to industry the authority for seed certification in Canada. In this model, industry would be responsible for delivering everything from determination of eligibility for seed varietal certification, to seed crop certification, to seed standards and testing. Government could also delegate other authorities required to facilitate the operation of a unified industry delivery model. Government would continue to oversee the system. All seed certification requirements should be removed from the *Seeds Regulations* and managed via incorporation by reference.

Required Action

The federal government delegates authority for the development of standards and the delivery of the seed certification program to a single industry organization, similar to the successful longstanding models in place in the Netherlands and France.

A Single Window with Variety Profiles

Industry organizations, government, and third-party service providers offer seed regulatory services to members/clients including standards development, variety registration/eligibility for certification, crop inspection, seed analysis, accreditation and oversight of registered seed establishments and seed laboratories, information on stewardship and export requirements, overall information management, and more.

Accessing these services and fulfilling regulatory obligations requires seed professionals to submit and access information at all of the various stages of commercialization from research through to seed available for sale. This requires users to navigate a web of organizations and processes, to submit the same information multiple times in differing formats, and to use both electronic and paper processes. In short, the user experience for seed professionals is inefficient and does not leverage technology. Even without completely overhauling the various processes and governance structures involved, government and industry can work together to reform how information is managed and stored, so that the users have a clean and simple one-stop shop.

When we talked to seed professionals (see *What Was Heard* report) the message was clear: make accessing and submitting information easier. But the present situation isn't just an annoyance, it entails real world costs. The *Economic Impact Assessment and Risk Analysis* (p.23) estimated that inefficiencies in entering information multiple times and the costs associated with providing information today cost the industry between $300K and $1M in unnecessary time and expense.

The Single Window idea starts with a more user-friendly web interface, but goes far beyond. It encompasses the industry-government partnership necessary to: allow product developers and seed companies to enter on-line product data, such as for registration, eligibility for certification, variety listing, and PBR protection once; consolidate key seed regulatory and related program services (e.g., seed quality assurance, phytosanitary inspections, certification) within a single third party delivery vehicle; and accelerate system redesign to incorporate technology enablers and to integrate regulatory and other services that add value for users. Ultimately we envision a service, wherein an industry-staffed office would help shepherd all parties through the requisite processes and approvals.

In addition, the splintered review processes of today funnel information on variety registration, plant breeder's rights, market access provisions, stewardship requirements, and more into siloes. As a result, there is no single, comprehensive and authoritative source of information about varieties approved for use in Canada. This means that producers and crop handlers have to spend valuable time searching for information, or take the chance of assuming risks and liabilities of which they have no knowledge. The *Economic Impact Assessment and Risk Analysis-Summary Report* (p.23) estimated that the industry could realize savings of $1.5M in search costs alone, by making variety information clear and available. A variety profile would include information on varietal identity, intellectual property features, product distributors, breeding methods, geographic areas for production, stewardship requirements, market access information, and more. This would not include the sharing of any confidential business or proprietary information. When you buy any variety in Canada you will know exactly what it is, how it is to be used, and your legal obligations with respect to growing and selling that product.

A single window for all services and information, including a variety profile open to all, and an overall push toward technology adoption will create an additional cumulative benefit: enhancing traceability throughout the seed system. Traceability is and will continue to be extremely important for agriculture customers and end-consumers. Consolidating information processes, sharing variety information openly, and adopting leading edge technologies to drive process improvement will all contribute to an enhanced traceability system for seed.

Required Action

Industry work with government to deliver a single window for information and services, including a variety profile. This begins with an integrated online user experience, and would expand to include greater integration of the underlying systems and business processes that support the system overall.

Building the Next Generation Seed Organization

Today five separate seed organizations – the Canadian Seed Growers' Association, the Canadian Seed Institute, the Canadian Seed Trade Association, the Commercial Seed Analysts Association of Canada, and the Canadian Plant Technology Agency – manage various aspects of the seed system, along with government, and represent the interests of different professional groups. A sixth organization – CropLife Canada – also plays a role in plant biotechnology policy, as part of its broader mandate. Seed is a large and complex business in Canada, but not so big that it requires government, six different national organizations, and six boards of directors, to operate parts of the regulatory, service provision, and advocacy system. As a result, and before the Seed Synergy Project, the voice of the seed sector had been fractured and the organizations forced to invest considerable time and resources in basic coordination with one another, even though many of their members overlap. Each seed organization fills a unique role in the system, but overall the sector could be much more efficient.

In spite of having several different organizations, the cumulative size of the seed industry organizations is small. Each organization is lean, with no redundancy or ability to resource serious succession planning. This lack of a critical mass makes the organizations vulnerable to attrition, particularly of experienced senior staff. The relatively small scale of each organization makes sectoral level investment difficult. Supporting the professional development of seed sector professionals is critical – seed is a fast paced, high-tech marketplace – but providing professional development resources is only possible in a larger context, pooling resources, and taking a whole-of-industry view.

Seed organizations have already begun to work more closely to align their (already largely complementary) policy and advocacy agendas, and share resources to drive efficiency wherever possible. The case for doing so is clear, and a desire for greater coordination has been expressed throughout the membership of each organization. The organizations can go further, though, through formal structural changes to consolidate.

The Seed Synergy partners looked at a number of organizational models. An independent third-party expert examined the roles of each organization and the possible models, from loose affiliation, to formal consolidation, to creating another new organization to coordinate the existing groups. In the end, the simplest answer makes the most sense: an amalgamation of all five seed organizations, to create a single "Seeds Canada" organization.

In addition, we propose a memorandum of understanding between a future Seeds Canada and CropLife Canada to ensure harmonized policy agendas and close collaboration on issues of mutual interest. CSTA and CropLife Canada have such a memorandum in place today and it has proven very effective in ensuring cooperation on key issues. Similar memoranda of understanding could be negotiated with other seed and agricultural organizations, including provincial seed growers and general farm organizations.

Ensuring cooperation on key issues will require a strong governance model and culture, with a view to ensuring the health and prosperity of the entire industry. Furthermore, we know that care will be required to ensure that the regulatory responsibilities of a future industry organization are managed independently of the advocacy role, to ensure credibility and legitimacy in the eyes of industry members, government, Canadians, and international markets.
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Required Action

Create a single, consolidated seed industry organization ready and able to speak with one voice, deliver the seed certification program, provide services to its members, deliver the training required to keep the sector current and enabling the quality assurance of the seed system, and lead the sector into the future, to the benefit of Canadian agriculture.

Resources

Economic Impact Assessment and Risk Analysis
Comprehensive quantitative review of the early Synergy proposals and a comparative analysis of models in place around the world

Canadian Plant Breeding Community Views on Novelty Regulations
A Report for CropLife Canada, the Canadian Seed Trade Association and the Canada Grains Council
Conducted by Dr. Stuart Smyth of the University of Saskatchewan
Broad survey of private and public breeders, gauging their attitudes towards the Canadian novelty program and its impact on their ability to innovate

CSTA Snapshot of Industry Investment
Survey of CSTA members focusing on research investment, by crop kind, and including historical comparisons

CropLife Driving the Canadian Advantage
2016 Submission to the House of Commons Standing Committee on Agriculture and Agri-Food, including specific policy recommendations for enhancing Canada's position with respect to plant science

What Was Heard Report
Summary of the cross-Canada Seed Synergy consultation sessions, summarizing the many views expressed by all members of the seed value chain on the preliminary Synergy vision

Canada's Seed System: A Summary Description
Report describing the structure of the seed system and some of the historical factors that explain why it is the way it is

Letter to Minister of Agriculture and his response to the Value Chain Roundtable Co-Chairs
Letter to the Minister on the subject of the need for changes to the delivery of the novel product regulations, including the Minister's response, acknowledging the major issues

Genetically Engineered Crops: Experiences and Prospects
US National Academies of Sciences, Engineering, and Medicine study examining a range of questions and opinions about the economic, agronomic, health, safety, or other impacts of genetically engineered crops and food

Seed Sector Profile
Seed Value Chain Roundtable-produced report on the Seed Sector, describing what it is, how it works, and who the players are

Unleashing the Growth Potential of Key Sectors
Advisory Council on Economic Growth report highlighting major opportunities in the Agri-culture and Agri-food sector, as well as critical barriers

Report of Canada's Economic Strategy Tables: Agri-food
Report delving further into specific opportunities and challenges for Canadian agri-food, particularly around innovation and regulatory reform to enable growth.

Canada: A Nation of Innovators

Government of Canada report describing the government's Innovation Agenda, an overarching strategy which directly impacts the seed sector as a centre of innovation